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10/534,987	05/16/2005	Hiroaki Sudo	L9289.05135	1913

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EXAMINER	
LOO, JUVENA W	

ART UNIT	PAPER NUMBER
2616	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/534,987	SUDO, HIROAKI	
	Examiner	Art Unit	
	Juvena Loo	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2,5-12, and 14-17* is/are rejected.

7)☒ Claim(s) *3,4 and 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *May 16, 2005; August 03, 2005; and January 10, 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 12, and 15 – 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mody et al. (US 2002/0181509 A1) in view of Diepstraten et al. (5,422,887).

Mody et al. discloses a system for synchronizing data transmitted across a channel in a wireless Orthogonal Frequency Division Multiplexing (OFDM) comprising:

Regarding claim 1, *a transmitting apparatus comprising*:

an orthogonal frequency division multiplexing section that performs orthogonal frequency division multiplexing of a transmit signal (Mody: see Figure 2 and Figure 3, 36 and 38; see also "The encoder 14 and OFDM modulators…referred to herein as samples" in page 3, section 0035 through page 4, section 0046);

an insertion section that inserts a guard interval in a transmit signal that has undergone orthogonal frequency division multiplexing by said orthogonal frequency division multiplexing section (Mody: see Figure 3, cyclic prefix inserter 40 and "The output from the IDFT stage…Inter Symbol Interference (ISI)" in page 4, section 0048) .

However, Mody does not disclose the feature: *a control section that increases a length of said guard interval inserted by said insertion section as a number of retransmissions increases*.

Mody discloses a control section that increases a length of said guard interval inserted by said insertion section to ensure that the time delay of transmitting a signal across a channel does not exceed the guard interval (Mody: see "The cyclic prefix inserter 40 repeats G…thereby eliminating ISI" in page 4, section 0048). In other words, Mody discloses a method of increasing the length of the guard interval according to the delay of a transmitted signal across the channel.

Diepstraten et al. discloses a method to improve access fairness while reducing the collision probability in a wireless local area network comprising a relation between the number of retransmission attempts and the backoff time which, in turn, is an integral number of slot time that is configurable and normally based on the maximum end to end round trip delay time of the network (Diepstraten: see "The dynamics of collision handling are…after each retransmission attempt" in column 4, lines 42 – 63). In other words, Diepstraten et al. discloses how the end to end delay time is related to the number of retransmission.

Therefore, the combination of Mody and Diepstraten et al. disclose the claimed feature: *a control section that increases a length of said guard interval inserted by said insertion section as a number of retransmissions increases* (Mody: "The cyclic prefix inserter 40 repeats G…thereby eliminating ISI" in page 4, section 0048; and "The

dynamics of collision handling are…after each retransmission attempt" in column 4, lines 42 – 63).

Regarding claim 12, *further comprising a spreading section that performs spreading processing of a transmit signal, wherein said orthogonal frequency division multiplexing section performs orthogonal frequency division multiplexing processing of a transmit signal that has undergone spreading processing by said spreading section* (Mody: see Figure 2 and "The encoder 14...in respective OFDM modulators" in page 3, section 0036 through page 4, section 0044).

Regarding claim 15, *a base station apparatus equipped with a transmitting apparatus, said transmitting apparatus (*Mody: see Figure 1, 12, 14, 16, and 18) *comprising*:

an orthogonal frequency division multiplexing section that performs orthogonal frequency division multiplexing of a transmit signal (Mody: see Figure 2 and Figure 3, 36 and 38; see also "The encoder 14 and OFDM modulators…referred to herein as samples" in page 3, section 0035 through page 4, section 0046);

an insertion section that inserts a guard interval in a transmit signal that has undergone orthogonal frequency division multiplexing by said orthogonal frequency division multiplexing section (Mody: see Figure 3, cyclic prefix inserter 40 and "The output from the IDFT stage…Inter Symbol Interference (ISI)" in page 4, section 0048).

However, Mody does not disclose the feature: *a control section that increases a length of said guard interval inserted by said insertion section as a number of retransmissions increases*.

Mody discloses a control section that increases a length of said guard interval inserted by said insertion section to ensure that the time delay of transmitting a signal across a channel does not exceed the guard interval (Mody: see "The cyclic prefix inserter 40 repeats G…thereby eliminating ISI" in page 4, section 0048). In other words, Mody discloses a method of increasing the length of the guard interval according to the delay of a transmitted signal across the channel.

Diepstraten et al. discloses a method to improve access fairness while reducing the collision probability in a wireless local area network comprising a relation between the number of retransmission attempts and the backoff time which, in turn, is an integral number of slot time that is configurable and normally based on the maximum end to end round trip delay time of the network (Diepstraten: see "The dynamics of collision handling are…after each retransmission attempt" in column 4, lines 42 – 63). In other words, Diepstraten et al. discloses how the end to end delay time is related to the number of retransmission.

Therefore, the combination of Mody and Diepstraten et al. disclose the claimed feature: *a control section that increases a length of said guard interval inserted by said insertion section as a number of retransmissions increases* (Mody: "The cyclic prefix inserter 40 repeats G…thereby eliminating ISI" in page 4, section 0048; and "The

dynamics of collision handling are…after each retransmission attempt" in column 4, lines 42 – 63).

Regarding claim 16, *a communication terminal apparatus equipped with a transmitting apparatus* (Mody: see Figure 1, 8), *said transmitting apparatus comprising*:

an orthogonal frequency division multiplexing section that performs orthogonal frequency division multiplexing of a transmit signal (Mody: see Figure 2 and Figure 3, 36 and 38; see also "The encoder 14 and OFDM modulators…referred to herein as samples" in page 3, section 0035 through page 4, section 0046);

an insertion section that inserts a guard interval in a transmit signal that has undergone orthogonal frequency division multiplexing by said orthogonal frequency division multiplexing section (Mody: see Figure 3, cyclic prefix inserter 40 and "The output from the IDFT stage…Inter Symbol Interference (ISI)" in page 4, section 0048).

However, Mody does not disclose the feature: *a control section that increases a length of said guard interval inserted by said insertion section as a number of retransmissions increases*.

Mody discloses a control section that increases a length of said guard interval inserted by said insertion section to ensure that the time delay of transmitting a signal across a channel does not exceed the guard interval (Mody: see "The cyclic prefix inserter 40 repeats G…thereby eliminating ISI" in page 4, section 0048). In other

words, Mody discloses a method of increasing the length of the guard interval according to the delay of a transmitted signal across the channel.

Diepstraten et al. discloses a method to improve access fairness while reducing the collision probability in a wireless local area network comprising a relation between the number of retransmission attempts and the backoff time which, in turn, is an integral number of slot time that is configurable and normally based on the maximum end to end round trip delay time of the network (Diepstraten: see "The dynamics of collision handling are…after each retransmission attempt" in column 4, lines 42 – 63). In other words, Diepstraten et al. discloses how the end to end delay time is related to the number of retransmission.

Therefore, the combination of Mody and Diepstraten et al. disclose the claimed feature: *a control section that increases a length of said guard interval inserted by said insertion section as a number of retransmissions increases* (Mody: "The cyclic prefix inserter 40 repeats G…thereby eliminating ISI" in page 4, section 0048; and "The dynamics of collision handling are…after each retransmission attempt" in column 4, lines 42 – 63).

Regarding claim 17, a transmitting method comprising:

a step of performing orthogonal frequency division multiplexing of a transmit signal (Mody: see Figure 2 and Figure 3, 36 and 38; see also "The encoder 14 and OFDM modulators…referred to herein as samples" in page 3, section 0035 through page 4, section 0046);

a step of inserting a guard interval in a transmit signal that has undergone orthogonal frequency division multiplexing (Mody: see Figure 3, cyclic prefix inserter 40 and "The output from the IDFT stage…Inter Symbol Interference (ISI)" in page 4, section 0048).

However, Mody does not disclose the feature: *a step of lengthening a guard interval inserted by said insertion step as a number of retransmissions increases*.

Mody discloses a control section that increases a length of said guard interval inserted by said insertion section to ensure that the time delay of transmitting a signal across a channel does not exceed the guard interval (Mody: see "The cyclic prefix inserter 40 repeats G…thereby eliminating ISI" in page 4, section 0048). In other words, Mody discloses a method of increasing the length of the guard interval according to the delay of a transmitted signal across the channel.

Diepstraten et al. discloses a method to improve access fairness while reducing the collision probability in a wireless local area network comprising a relation between the number of retransmission attempts and the backoff time which, in turn, is an integral number of slot time that is configurable and normally based on the maximum end to end round trip delay time of the network (Diepstraten: see "The dynamics of collision handling are…after each retransmission attempt" in column 4, lines 42 – 63). In other words, Diepstraten et al. discloses how the end to end delay time is related to the number of retransmission.

Therefore, the combination of Mody and Diepstraten et al. disclose the claimed feature: *a step of lengthening a guard interval inserted by said insertion step as a number of retransmissions increases* (Mody: "The cyclic prefix inserter 40 repeats G…thereby eliminating ISI" in page 4, section 0048; and "The dynamics of collision handling are…after each retransmission attempt" in column 4, lines 42 – 63).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Mody et al. by using the features, as taught by Diepstraten et al., in order to increase data throughput in the network by improving access fairness while reducing the collision probability (Diepstraten: see Abstract).

3. Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Mody et al. (US 2002/0181509 A1) in view of Diepstraten et al. (5,422,887) and further in view of Demjanenko et al. (US 2002/0051501 A1).

Mody et al. and Diepstraten et al. disclose the claimed limitations in paragraph 2 above. Mody et al. and Diepstraten et al. do not disclose the following features: regarding claim 2, *further comprising a coding section that turbo codes said transmit signal and outputs systematic bit data and parity bit data, wherein said control section inserts a guard interval independently for said systematic bit data and said parity bit*

data; regarding claim 5, *further comprising an allocation section that allocates said systematic bit data and said parity bit data to different symbols.*

Demjanenko et al. discloses a transmitter produces a modulated signal with forward error correction from an information bit stream comprising the features:

Regarding claim 2, *further comprising a coding section that turbo codes said transmit signal and outputs systematic bit data and parity bit data, wherein said control section inserts a guard interval independently for said systematic bit data and said parity bit data* (Demjanenko: see Figures 1, 3, 75, and 77; see also "The transmitter produces…transmitted over a communication link").

Regarding claim 5, *further comprising an allocation section that allocates said systematic bit data and said parity bit data to different symbols* (Demjanenko: see Figures 1, 3, 75, and 77; see also "The transmitter produces…transmitted over a communication link").

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Mody et al. with Diepstraten et al. by using the features, as taught by Demjanenko et al., in order to accommodate a variable symbol rate that could be adapted to a particular channel characteristic (Demjanenko: see page 5, section 0120).

4. Claims 6 – 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Mody et al. (US 2002/0181509 A1) in view of Diepstraten et al. (5,422,887) and further in view of Demjanenko et al. (US 2002/0051501 A1) and further in view of Sudo (EP 1014639 A2).

Mody et al., Diepstraten et al., and Demjanenko et al. discloses the claimed limitations in paragraph 3 above. Mody, Diepstraten, and Demjanenko do not disclose the following features: regarding claim 6, *wherein said control section sets a length of said guard interval according to delay distribution information*; regarding claim 7, *wherein said delay distribution information is transmitted from a communicating party*; regarding claim 8, *wherein said delay distribution information is detected from a received signal;* regarding claim 9, *wherein said control section sets a length of said guard interval according to a transmission time interval; r*egarding claim 10, *wherein said control section sets a length of said guard interval according to a used band*; regarding claim 11, *wherein said control section makes said guard interval larger in proportion as a ratio of said used band to a band whose use is permitted is smaller; r*egarding claim 14, *wherein said control section makes a length of a guard interval in a retransmission an integral multiple of a length of a guard interval in a first transmission*.

Sudo discloses an OFDM transmission/reception apparatus with selection of optimal guard interval length comprising the features:

Regarding claim 6, *wherein said control section sets a length of said guard interval according to delay distribution information* (Sudo: see "The OFDM transmission/reception apparatus…transmission signal and transmitted" in page 7, section 0058 through page 8, section 0069).

Regarding claim 7, *wherein said delay distribution information is transmitted from a communicating party* (Sudo: see "The OFDM transmission/reception apparatus…transmission signal and transmitted" in page 7, section 0058 through page 8, section 0069).

Regarding claim 8, *wherein said delay distribution information is detected from a received signal* (Sudo: see "The OFDM transmission/reception apparatus…transmission signal and transmitted" in page 7, section 0058 through page 8, section 0069).

Regarding claim 9, *wherein said control section sets a length of said guard interval according to a transmission time interval* (Sudo: see "Then, guard interval inserter 105 adds…thus can generate a guard interval" in page 6, section 0041 through page 7, section 0049).

Regarding claim 10, *wherein said control section sets a length of said guard interval according to a used band* (Sudo: see "Then, guard interval inserter 105

adds…thus can generate a guard interval" in page 6, section 0041 through page 7, section 0049).

Regarding claim 11, *wherein said control section makes said guard interval larger in proportion as a ratio of said used band to a band whose use is permitted is smaller* (Sudo: see "Then, guard interval inserter 105 adds…thus can generate a guard interval" in page 6, section 0041 through page 7, section 0049).

Regarding claim 14, *wherein said control section makes a length of a guard interval in a retransmission an integral multiple of a length of a guard interval in a first transmission* (Sudo: see "Then, guard interval inserter 105 adds…thus can generate a guard interval" in page 6, section 0041 through page 7, section 0049).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Mody et al. with Diepstraten et al. and Demjanenko et al. by using the features, as taught by Sudo, in order to improve transmission efficiency (Sudo: see page 4, section 0028).

Allowable Subject Matter

5. Claims 3, 4, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3, the prior arts do not disclose the feature: *wherein said control section makes a length of said guard interval of said systematic bit data longer than a length of said guard interval of said parity bit data.*

Regarding claim 4, the prior arts do not disclose the feature: *wherein said control section lengthens only said guard interval of said systematic bit data as said number of retransmissions increases.*

Regarding claim 13, the prior arts do not disclose the feature: *wherein a spreading ratio of said spreading section is made "1" and a code multiplexing number of said transmit signal is made "1."*

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juvena Loo whose telephone number is (571)270-1974. The examiner can normally be reached on Monday - Friday: 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Juvena Loo/

Examiner, Art Unit 2616

March 02, 2008

/Kwang B. Yao/

Supervisory Patent Examiner, Art Unit 2616